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A PLANT-CASE FOR THE CONTROL OF RELATIVE HUMIDITY

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In connection with some work on the non-available water in soils the writer has devised a plant-case in which plants can be grown under conditions of constant humidity. The apparatus has given excellent satisfaction, not only in its efficiency for controlling humidity, but also because it has made it possible to determine, within a reasonable degree of accuracy, the time of death of the plants. This is a necessity in non-available water determinations. The relative humidity is controlled by forcing a current of dried air into the plant-case by means of an air pump, at a rate necessary to balance the moisture given off by the plants. It is often desirable to control humidity conditions when working with plants; and as far as known to the writer the only published description of a humidity balance is that of a case devised by Gregaïre and Hendrick.* This publication has not been accessible to me.

The plant-case is a cubical box, two feet on a side. The top and four sides are made of plate glass, one-fourth of an inch thick. Any kind of glass will do provided it be free from irregularities which might refract the light-rays, like a lens.

The frame of the case is made of wooden pieces fitted together with screws, and so arranged as to hold the glass sides as a window pane is held in its sash. All of the glass is set in asphalt. Asphalt is also used to close the joints where the several pieces of the frame are fastened together. The front of the case contains a door, which is held, by means of twelve

* Reported by A. Petermann (Bul. Inst. Chim. et Bact. Gemblooux, 70 : 22-3, 1901). See Exp. Sta. Rec. 13 : 1018. 1901-02.

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bolts, in practically air-tight contact with its bed, which is cut into the case frame. The bottom of the case is of wood, covered inside with a continuous sheet of tin.

The pump used for forcing air into the case was made by the local tinner at an expense of twenty-five cents. The cylinder of the pump is four inches long and two inches in diameter. A pump of this size will deliver, approximately, one hundred cubic centimeters of air at each stroke, and, at a rate of eighty strokes per minute, it will change the air in the plant-case every thirty minutes.

The air passes from the pump into a filter-flask, which serves as a "stuffing-box," from which it passes into the series of wash-bottles at a more uniform rate than it would if the pump were connected directly with the wash-bottles. Considerable acid is swept along by the air, from one wash-bottle to the next. This exposes much more surface of acid to the air, but necessitates the inclusion of a bottle at the end of the series to catch the acid thus carried over.

An electric fan, within the case, keeps the air well mixed. A thermograph of convenient size, a recording hygrometer, and a small hygrometer of the "Mitthof's" pattern were also kept in the case. This latter instrument is much more sensitive than the recording hygrometer, and thus indicates any temporary variations in the humidity.

The air in the case can be reduced from saturation to approximately 10 per cent. (hygrograph record) in 12 hours, even when the case is full of living plants. In these experiments the air was continually kept as dry as possible, but the humidity could have been maintained at any desired per cent. within a range limited only by the sensitiveness of the hygrometer used, had the index-arm of the hygrometer been made to open and close mercury switches, operating the circuit of the electric motor which drives the pump. The current of dry air would then have ceased when the desired humidity was reached.

As stated above, the time of death of the plants grown in the case could be determined quite closely. By holding the humidity very low all of the time, the plants dried out at once, and became

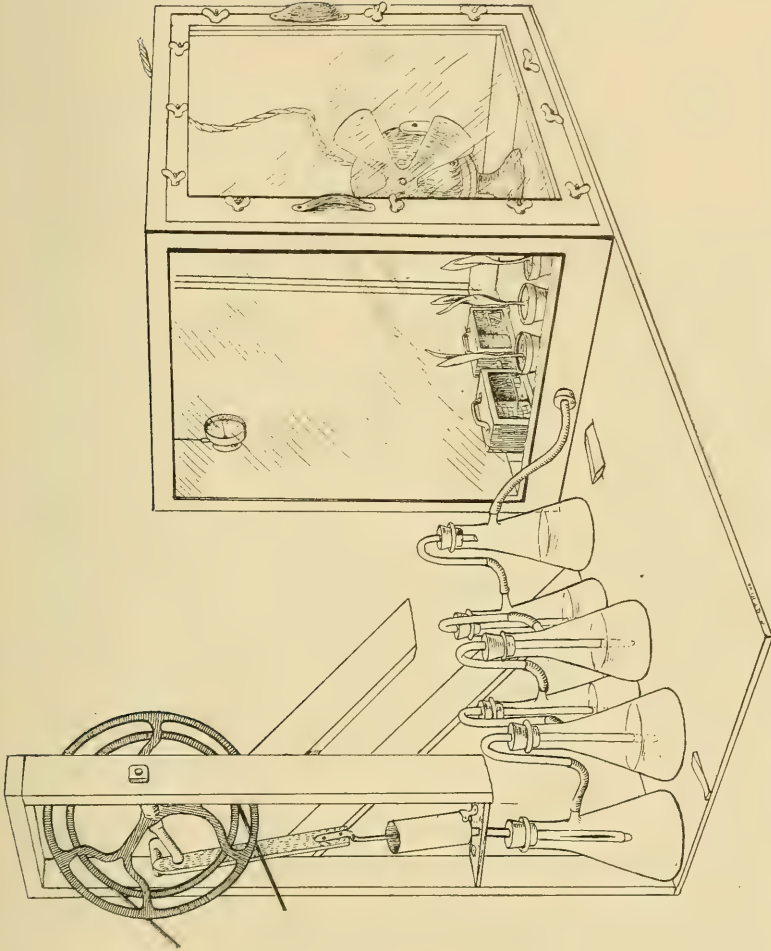


FIG. 1. Plant-case for the control of relative humidity. Description in text. (Illustrated with the aid of the Catherine McManes fund.)

practically crisp, as soon as the protoplasm died. There were no temporary recoveries to complicate the determination, as is the case when the humidity relations are fluctuating.

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LOCAL FLORA NOTES — III

BY NORMAN TAYLOR

A goodly number of replies to questions asked in the first two numbers of this series have been already received. The members of the club are so evidently interested that it can be only a matter of short duration until many of the disputed or little known species are fairly well understood, so far as the local range* is concerned. Several letters and post cards containing information on the distribution of certain plants have come in, unaccompanied by specimens. Of the authenticity of these statements there is, for the most part, no question. But without a specimen deposited in the club's herbarium, where it constitutes an indisputable record, the present members of the Torrey Club can scarcely expect to silence the questionings of an incredulous posterity. Members are urged to continue their kindly coöperation so that the work may be pushed as rapidly as possible. Specimens submitted in answer to questions will be put in the club herbarium and full acknowledgment will be made.

The list continues :

COMMELINACEAE

1. *Commelina hirtella* Vahl. The only specimen in our collections is from near Camden, N. J. Judging from the manuals it should be found throughout southern Jersey. Has any one seen it anywhere else in New Jersey except near Camden?

*The local flora range as prescribed by the Club's preliminary catalog of 1888 is as follows: All the state of Connecticut; Long Island; in New York, the counties bordering the Hudson River, up to and including Columbia and Greene, also Sullivan and Delaware counties; all the state of New Jersey; and Pike, Wayne, Monroe, Lackawanna, Luzerne, Northampton, Lehigh, Carbon, Bucks, Berks, Schuylkill, Montgomery, Philadelphia, Delaware, and Chester counties in Pennsylvania.